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# **UFZ-Discussion Papers**

**Department of  
Ecological Economics and  
Environmental Sociology (OEKUS)**

**2/2000**

**Intergovernmental Fiscal Relations  
and Regional Sustainability**

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Mai 2000

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## **Abstract**

Regions often consist of both urban, densely populated areas and rural, more remote areas. In contrast to the acknowledged socio-economic functions of urban agglomerations, rural and remote areas usually provide ecological services for society as a whole. A number of these ecological services cause costs within the jurisdiction concerned but externally benefit others. Therefore, the aim of this paper is to analyse the role fiscal federalism and fiscal instruments can play in addressing the imbalance of socio-economic and ecological public functions assigned to urban and rural areas in regional development. For this purpose, an investigation of the different role of socio-economic and ecological functions in intergovernmental fiscal relations is carried out by way of example for the Federal Republic of Germany.

Due to the significance of ecological functions for regional sustainable development, intergovernmental fiscal relations between the state and the local level of government should take into consideration appropriate ecological indicators. Based on a status quo analysis of the German state fiscal equalisation laws, the paper presents options for systematically integrating ecological functions and indicators into the existing legal framework. Environmental federalism would then be realised regarding both the ecological functions and the financial resources to secure the provision of ecological services. This would fulfil a basic prerequisite of sustainable development – taking into account ecological, economic and social aspects – for fiscal instruments of prime importance to the local and regional level of government, thereby helping to make regional sustainability a reality.

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## 1 Introduction

Sustainable development has become a key concept within environmental policy analysis. In its early stages, it developed in the context of global environmental problems (e.g. WCED 1987). However, sustainable development involves the proper integration of environmental concerns into policy-making at all levels of decision (Hardy and Lloyd 1994). Based on the concrete problems in mind, the policy levels which have to be addressed are international, national, regional and local. Linking these thoughts to economic reasoning, the assignment of functions to different levels of government is found to be part of the basic theory of fiscal federalism (Oates 1972, 1999). Therefore, there is an important link between the implementation of the sustainability concept, environmental policy, and the economic theory of federalism.

In the following, special attention will be paid to the local and regional level of government in its significance for sustainable development. Due to different cultures, socio-economic conditions and individuals' preferences, and the varying climatic, physical and biological conditions prevailing on Earth, sustainable development paths will vary substantially for different regions (Ring et al. 1999). At the local and regional level, land-use practices are of pre-eminent importance for sustainable development strategies, for they represent economic activities with a direct spatial link to and impact on the region's environment. The crucial question is, how can ecologically necessary and desirable land-use practices as a contribution to regional sustainability be encouraged – and are there appropriate fiscal instruments that could support the implementation of sustainable strategies related to land-use?

Regions, being understood as subnational spatial entities, often consist of both urban, densely populated areas and rural, more remote areas. Urban areas are mostly characterised by high development pressure and highly competing land-uses, economic activities often being spatially related to urban centres or their surroundings. Rural and remote areas usually provide ecological services for society as a whole such as drinking water protection, resource provision, and the availability of unfragmented landscapes that are valuable habitats for endangered species. Successful regional sustainable development strategies have to address both of these areas; in fact, they have to consider the imbalance between urban and rural areas concerning the specific land-uses in place (Bauer et al. 1996; SRU 1996; Ewers et al. 1997).

The aim of this paper is to analyse the role fiscal federalism can play in addressing the imbalance of socio-economic and ecological functions assigned to urban and rural areas in regional development. For this purpose, a brief overview of the intergovernmental fiscal rela-

tions in federal systems will provide the groundwork for linking the basic theory of fiscal federalism with environmental issues. An investigation of the different role of socio-economic and ecological functions in intergovernmental fiscal relations is carried out by way of example for the Federal Republic of Germany. Specifically, the fiscal equalisation laws of the German states are proposed as a means to integrate ecological aspects and thus help rural areas to sustain their natural endowment by way of offering compensation for their ecological services.

## **2 Fiscal federalism and the environment**

### **2.1 Intergovernmental fiscal relations in federal systems**

Fiscal federalism as a subfield of public finance explores the roles of the different levels of government and the ways in which they relate to one another through fiscal instruments. It aims at improving the performance of the public sectors and the provision of their services by aligning responsibilities and fiscal instruments with the proper level of government. The basic task is one of effectively and efficiently assigning functions and instruments to the central, state, and local governmental levels in federal systems, or, in other words, determining the optimal size of jurisdiction for the various public functions concerned. As Oates (1999, p. 1120) puts it, "... we need to understand which functions and instruments are best centralised and which are best placed in the sphere of decentralised levels of government".

At a general level, the basic theory of fiscal federalism states that central government should be responsible for the macroeconomic stabilisation function and for income redistribution (Musgrave 1959; Oates 1972). To carry out these functions, state and local governments only have limited means. Concerning the allocation function of the public sectors, the basic principle of fiscal decentralisation has been put forward. The provision of most public goods and services is more efficiently guaranteed when production and consumption are limited to the lowest governmental level possible. In this way, the regionally differing preferences of the population can be more adequately reflected (Tiebout 1956). In the European Union, fiscal decentralisation is connected to the term "subsidiarity", the roots of which are found in 20<sup>th</sup> century Catholic social philosophy (Döring 1997, p. 29). According to the subsidiarity principle as consolidated and adopted by the Maastricht Treaty of 1992, public policy and its implementation should be allocated to the smallest jurisdiction with the competence to achieve the objectives.

The general decentralisation rule for allocating public goods and services to lower governmental levels only applies in the absence of economies of scale. In the presence of economies of scale, the production of the public goods concerned should be moved to the adequate, cost-efficient centralised level (Postleyp and Döring 1996). Furthermore, due to the characteristics of non-rivalry and non-excludability of many public goods, some of them are associated with spatial externalities between jurisdictions (spillovers). Here, the principle of fiscal equivalence advocates achieving a “match between those who receive the benefits of a collective good and those who pay for it” (Olson 1969, p. 463). Social welfare is increased through the differentiation of public services in accordance with local costs and preferences. However, the implementation of fiscal equivalence does not necessarily require the shifting of competence to a more centralised level of government. Negotiations between the parties concerned or the formation of administrative institutions mapping the spatial range of costs and benefits are also discussed to internalise spatial externalities (e.g. Breton 1965).

## **2.2 Environmental federalism**

Environmental federalism links environmental issues with the basic theory of fiscal federalism. Compared to the general expositions above, environmental federalism necessitates an additional element concerning the principle of fiscal equivalence. It is no longer only the group benefiting that should come up with the costs of the public goods and services produced, and consequently, decide on the size of the jurisdiction; it is also the individuals responsible for polluting the environment that must be considered when deciding on the boundaries of the appropriate jurisdiction. To sum up this context, the term “ecological equivalence” has been coined (Huckestein 1993). Döring and Fromm (1997) developed a two-step procedure to apply the principle of fiscal equivalence to environmental problems. Firstly, the appropriate jurisdiction of the environmental problem concerned has to be determined, including all the parties affected (e.g. polluting and harmed individuals). Secondly, a decision on financing public intervention has to be made. This decision may follow the polluter-pays-principle, but it can also be made on grounds of other principles (e.g. Coase theorem).

The public-good nature of most environmental goods and services raises the above-mentioned question of which governmental level should best be responsible for their production. Following the general decentralisation rule for the allocation function of public services, lower levels of government should be assigned the task of producing environmental goods and services where appropriate. However, due to the specific characteristics of natural resources

and environmental quality, the implementation of this general rule begs a more differentiated view. This is reflected in the on-going debate on the responsibilities of the national or even supranational level versus the state or local governmental level in setting environmental standards, or carrying out other environmental functions (Döring 1997; Scheberle 1997; Oates 1998, 1999).

In the United States, far-reaching proposals have been put forward under the term of “devolution” to return environmental standard-setting and policy-making from the national level to local and state governments and, where possible, to private individuals (Anderson and Hill 1996). By contrast, Smith et al. (1997, p. 28) highlight the importance of the information necessary, and the relevance of specific details to the application of conceptual models of federalism that “are especially important in structuring the jurisdictional responsibilities for the design and implementation of different aspects of environmental policy”. The spatial dimension of environmental resources, particularly their linkages in creating spillover effects, must be considered when evaluating the costs of attaining any ambient quality level. Environmental goods require the production component of the delivery of local public goods to be more carefully investigated. This is a difference compared to most discussions in fiscal federalism that more often focus on available alternatives for financing public intervention or on preference heterogeneity in its implication for the amounts and types of public goods provided by different jurisdictions (Smith et al. 1997). For Canada, a critical view of passing too much responsibility from the federal to the provincial level is presented by Harrison (1996).

In Europe, environmental federalism has been rediscovered and extensively discussed since the Treaty of Maastricht on European Union, that fundamentally strengthened the principle of subsidiarity (e.g. Huckestein 1993; Hansjürgens 1996; Karl 1996; Döring 1997; Oates 1998). Despite the firm and explicit reinforcement of the subsidiarity principle in the new Article 3b of the Treaty, a fair amount of leeway is left for interpretation. Therefore, any concrete implementation of environmental policy has to go into the specific details of the subject matter. For example, the discovery and dissemination of basic knowledge about environmental damage and about the effectiveness of various policy instruments need to be assigned to a more centralised level of government, for this kind of public good tends to be under-provided at decentralised levels (Oates 1998). The same holds for highly mobile environmental compartments and associated pollutants that easily cross national boundaries creating far-reaching spatial externalities (Hansjürgens 1996). Sulphur dioxide, carbon dioxide and ozone are typi-



cal air pollutants with a need for emission policies subject to more centralised governmental levels.

In contrast, environmental policy associated with less mobile environmental compartments is better suited for assignment to lower levels of government. This is due to the lower probability of causing transboundary spatial externalities. Problems of land-use and soil contamination, as well as functions associated with inland waters, such as lakes or groundwater resources, can usually be solved within national boundaries. The same holds for many issues related to nature conservation and landscape protection. Depending on the type of natural resources and environmental problems, there is room for even further decentralisation. In the federal system of Germany, environmental functions related to land-use planning, water resources and nature conservation are only subject to framework regulation at the national level. Practical implementation is delegated to the various state laws, regulating the respective functions of the state, regional and local levels of government.

Despite the general suitability of land-use questions to be assigned to lower governmental levels, spatial externalities may also exist requiring appropriate solutions. This is the case for special priority areas, e.g. regarding the conservation of rare species or the protection of drinking water resources, that cause costs within the concerned jurisdiction, but externally benefit others. Although developed for other public goods, such as education, a solution to this kind of problem has already been suggested by Olson (1969). Provided diseconomies of large-scale operation call for local provision, which is usually the case for public goods associated with land-use, these externalities should be internalised through government grants from more centralised levels, compensating the local government for the external benefits of its expenditures.

As we are interested in land-use related issues and regional sustainable development, we will further concentrate on the intergovernmental fiscal relations within a nation state and identify the relevant regulations. For the Federal Republic of Germany, we will as an example investigate the part socio-economic and ecological functions play within the system of fiscal federalism. We will study the various state equalisation laws and ask whether and how far present government grants already compensate local governments for the external benefits of their environmental expenditures.

### 3 Socio-economic and ecological functions in the German federal system

#### 3.1 Vertical and horizontal relations in the German federal system

In the German federal system, basic regulations concerning intergovernmental fiscal relations are part of the German Constitution. It was the financial reform of 1969 that fundamentally determined the present system of fiscal federalism (Lenk 1993; Zimmermann and Henke 1994). On the one hand, the fiscal equalisation law (*Finanzausgleichsgesetz*) in its version of 1969, together with its numerous subsequent amendments, specifically lay down the intergovernmental fiscal relations between the central level and the states (*Länder*). Essentially, they cover the vertical fiscal relations between the federal level and the state level, and horizontal fiscal relations among the states themselves. On the other hand, there are intergovernmental fiscal relations within the federal states that are regulated in the 13 different fiscal equalisation laws of the various German states. The latter comprise vertical fiscal relations between each state level and its local level of government (local and district councils), and in some of the states, horizontal fiscal relations between the local councils themselves. Due to the special importance of the corresponding fiscal instruments for regional sustainable development strategies, further analysis will focus on the fiscal relations between the states and their subsidiary governmental levels.

The local government level is given a relatively high degree of autonomy by the German Constitution. District councils (*Kreise*) and local councils (*Gemeinden*) derive their authority by implementing state or federal legislation, or by managing areas for which they have sole and direct responsibility. To carry out their functions, local governments require specific fiscal instruments (Zimmermann 1999). For this purpose, they rely on their own revenue sources such as local taxes and charges. In addition, local governments gain a considerable amount of income based on the intergovernmental fiscal relations laid down in the various state fiscal equalisation laws.

As for the vertical flow from the state level to the local level, intergovernmental fiscal grants represent an important source of local income. These grants constitute a distinctive and important role in fiscal federalism that can serve a number of different functions. Firstly, the literature emphasises the role of the internalisation of spillover benefits to other jurisdictions. Secondly, based on normative considerations of equity, they serve the purpose of fiscal equalisation among different jurisdictions. These equalising grants play a major role in the

fiscal system of Germany, as well as in other federal systems such as Canada and Australia (Oates 1999).

In a number of German states, the greater share of vertical transfers is given in the form of “unconditional grants”, i.e. lump-sum transfers to the local level of government to be used in any way the recipient wishes. The remaining share of vertical transfer is “conditional”, i.e., it is given for specific purposes and partly in the form of matching grants (the grantor only finances a specified share of the recipient’s expenditure).

### **3.2 The role of socio-economic functions and indicators**

Intergovernmental fiscal grants play an important role in local and regional development by way of securing financial resources to local jurisdictions to carry out their various public functions. Nevertheless, in their current mode of implementation as set out in the fiscal equalisation laws of the German states, they also represent a source of inequality between urban and rural areas.

Apart from the financial capacity of the local jurisdiction, the financial requirements determine the amount of unconditional grants transferred to the local government. Financial requirements are in turn based on a main indicator that is the number of inhabitants of the jurisdiction concerned. In most of the German states, the principal approach for allocating lump-sum transfers is defined by the product of the number of inhabitants and a weighting factor that increases with the population. Accordingly, the more inhabitants a local jurisdiction has, the higher the lump-sum transfers. The basic argument for this relationship dates back to Brecht (1932, p. 6), who formulated the “Law of the progressive parallel connection between public expenditure and population concentration”. A further justification has been put forward by Popitz (1932, p. 130), who argued that urban populations actually have a higher demand for public goods than rural ones. Nowadays, both arguments are highly controversial, and in the states of Rhineland-Palatinate and Schleswig-Holstein the weighting factor has already been abolished. For other states, the weighting factor is subject to much criticism in the public finances literature (e.g. for Saxony: Lenk and Birke 1998). However, even in the absence of the weighting factor, the dominance of an inhabitant-based indicator generally favours urban areas as opposed to rural areas due to the lower population densities of the latter.

Complementary to the inhabitant-based principal approach, some of the states also have additional approaches for allocating lump-sum transfers, e.g. taking into account the number of pupils, the social burdens, or the central functions of the local jurisdictions. Usually, these

additional indicators are also related to the socio-economic public functions of the jurisdictions. Only a few additional approaches consider spatially or environmentally related functions of local government. The latter concern jurisdictions suffering from mining damage (Saarland), local public functions related to spas (Hesse, Saarland), and jurisdictions located close to the frontier (Bavaria) (Henneke 1999).

Concerning conditional grants for specific purposes, once again, great consideration of socio-economic functions is to be observed in the various state equalisation laws. Here, areas such as transport and road construction, social burdens (e.g. assistance to the unemployed or the poor), health services, education and cultural investments (e.g. allocations to theatres and opera houses) are explicitly addressed as a potential motivation for application. Conditional grants for environmentally related public functions are rarely mentioned with the exception of sewage treatment and waste disposal facilities.

To sum up, urban and densely populated areas presently benefit from the system of inter-governmental fiscal relations due to their socio-economic and cultural functions and the respective indicators, especially those on which lump-sum transfers are based. Conversely, rural areas, due to their low population densities, get a much smaller share of the overall vertical flow.

### **3.3 The significance of ecological functions and indicators**

In the literature on environmental federalism, more general and theoretical expositions on linking federalism and the environment are often made for the case of environmental pollution. To stress the importance of natural resources protection and resource use on the one hand, and environmental pollution on the other hand, we would rather use the more comprehensive term “ecological” instead of “environmental” for the respective public functions and indicators. Having said this, we can move on to the significance ecological functions and indicators have for regional sustainable development.

Sustainable development represents a goal for overall policy formulation, be it ecological, economic or social policy. Therefore, it calls for an integrative policy viewpoint that addresses the interrelationship between different policies and the respective institutions (Ring et al. 1999). This holds for any governmental level, including the local and regional ones. However, fiscal federalism in Germany, as realised in the current fiscal equalisation laws, predominantly assigns economic and social functions to different governmental levels. This is also reflected in the socio-economic indicators on which the intergovernmental grant system is based.

Hence, the comprehensive implementation of sustainable development requires considering ecological functions and indicators in the system of intergovernmental fiscal relations. There are basically two arguments on which this claim can be legally founded.

The first argument is connected to Germany's membership of the European Union and the binding force of its legal framework. Since the Treaty of Amsterdam on European Union (1997), the principle of sustainable development has found its way into the European legal framework. Firstly, sustainable development is part of the Treaty's preamble as a general principle to be pursued by the Member States. Secondly, in the new Article 2 of the Amsterdam Treaty, the implementation of sustainable development expressly enjoys equal rights to the promotion of economic and social progress, and the achievement of high employment levels (Frenz and Unnerstall 1999, p. 173). The principle of sustainable development has hence become a leading concept for policy formulation in the Member States which, in combination with the subsidiarity principle, is waiting to be implemented at the appropriate governmental levels.

The second argument is connected to the development of German conservation and environmental policy. As of the 1970s, a sophisticated and complex legal framework came into force that assigned numerous functions to different governmental levels. As already mentioned above, for some areas such as water resources, nature conservation and regional planning, the federal level is responsible for passing national framework laws, whereas the states pass respective state laws. The latter constitute the detailed implementation of federal legislation and complement it by taking into account regional priorities. Depending on the design and interrelationship between federal, state, regional, and local ecological functions, respective public expenditures accrue. However, as opposed to other public functions existing for many decades and endowed with comparatively substantial financial resources to secure the provision of the related public goods and services, nature conservation and environmental policy still suffer from a lack of financial resources due to their short history and the relatively weak influence of environmental interest groups in the political process (e.g. Soell 1989; Kaule 1991, S. 353ff.; Henle 1995; Steffens 1997).

Both the general principle of sustainable development as adopted at the European level of government and the numerous ecological functions already assigned to the different governmental levels in Germany call for the consideration of ecological functions in the German intergovernmental fiscal relations. Obviously, both arguments rest on the normative assumption that current legal frameworks, be it the Treaty of Amsterdam on European Union or the ex-

isting set of rules concerning German conservation and environmental policy, are accepted as an orientation for adjusting German intergovernmental fiscal relations.

This assumption can be seen in divergence from standard economic studies in fiscal federalism. To determine any optimal level of government for the provision of public goods and services, investigations usually abstract from a given legal framework (Hansjürgens 1996). By contrast, economic reasoning in the public finances literature aims at identifying the optimal size of the jurisdiction from the angle of economic efficiency. Although this is an important standpoint, the primary interest of this paper lies in a different direction.

Here, we start from the basic viewpoint of sustainable development as a concept necessary to be implemented, and look for possible ways of its realisation. Furthermore, although we are well aware of the shortcomings and the room for improvement of the present German legal framework on nature conservation and the environment, for the purpose of this study we take it as a given fact that ecological functions are assigned to different governmental levels. Our concern is instead to contend that intergovernmental fiscal relations in the German federal system have not yet adequately acknowledged and integrated the development achieved by contemporary societies in the field of conservation and environmental policy during the last three decades. This paper argues that fiscal equalisation laws and fiscal instruments should mirror societal innovations. In our case this means that the relevant regulations should also consider ecological public functions just as they consider social and economic public functions.

The major question that follows is, how can rural and remote areas be rewarded for their positive ecological functions concerning nature and the environment? These functions also cause costs and spillovers, as do the acknowledged socio-economic functions. However, the ecological functions currently seem to be almost completely ignored within the intergovernmental grant systems of federal states. Therefore, in the next step we will analyse the extent to which the fiscal equalisation laws of the German states already consider ecological functions. From this analysis, options will be developed to further strengthen ecological functions in these laws.

## **4 Ecological functions in German state fiscal equalisation laws**

### **4.1 Status quo of ecological functions in state fiscal equalisation laws**

In a very basic sense, area-related approaches constitute the first step of acknowledging ecological functions. This is due to the importance of area and its associated land-uses for many ecological functions. The need to consider area as an indicator for allocating intergovernmental fiscal grants is especially important for large communities and for district councils as opposed to smaller communities that are part of the wider district (local councils) or district independent cities. The larger a community or district is and the farther away it is from an urban agglomeration, the higher the relevance of area-related indicators. These remote areas are often characterised by low population densities and, in terms of land-use, by a higher proportion of agricultural land and forestry, as well as more valuable habitats for rare species. Therefore, it is not surprising that consideration of area-related indicators has long been claimed by the German Association of District Councils (Henneke 1999). This is due to the cost relevance of area for financing specific local public functions. The larger the community or district area in combination with a lower population density, the more expensive the production of certain public goods and services. Bizer et al. (1998, p. 51), Bergmann (1999) and Henneke (1999) mention additional costs related to both ecological and socio-economic public functions such as nature conservation, agricultural affairs, waste disposal, water supply, public transport, education and health services.

Therefore, the majority of state equalisation laws already consider area-related indicators in one way or another, except in Lower Saxony (Bergmann 1999; Henneke 1999). In Brandenburg, Mecklenburg-Western Pomerania and Saxony-Anhalt, area is one of a number of indicators to distribute lump-sum transfers. Most states (Baden-Württemberg, Bavaria, Brandenburg, Hesse, Mecklenburg-Western Pomerania, Rhineland-Palatinate, Saarland, Saxony, Saxony-Anhalt, Schleswig-Holstein and Thuringia) make use of conditional grants for selected public functions that become more expensive with a larger district area. However, these grants usually cover road construction and maintenance, public transport and transport for schoolchildren. Although theoretical claims clearly cover ecological functions, existing regulations concerning area as an indicator in the various state equalisation laws predominantly concentrate on socio-economic functions.

Beyond area as a rather indirect indicator, several state equalisation laws directly consider selected ecological functions by means of conditional grants. With the exception of Saxony-Anhalt, all state equalisation laws explicitly name sewage and waste disposal. Most of the states also mention water supply (Brandenburg, Hesse, Mecklenburg-Western Pomerania, Rhineland-Palatinate, Saxony and Thuringia). Apart from these specified purposes, further ecological functions can sporadically be found in a few state laws. Baden-Württemberg additionally mentions soil protection, Brandenburg puts a focus on functions related to agriculture and tourism, while Mecklenburg-Western Pomerania considers landscape maintenance.

Only three states have already included a variety of additional ecological functions in their state equalisation laws. By way of conditional grants, Hesse supports projects in the areas of biotope protection and biotope networks, energy-saving measures and water conservation schemes. North Rhine Westphalia specifies lump-sum payments for spas, special grants for the preservation of cultural landscapes and natural monuments, the ecological rehabilitation and landscaping of the Emscher-Lippe-area, and conditional grants for the rehabilitation of old industrial sites. Schleswig-Holstein provides loans for recreational measures, nature conservation and landscape maintenance, rehabilitation projects, and a variety of energy saving measures.

To sum up, only three states already mention a variety of broad ecological functions; most state equalisation laws do not systematically incorporate ecological functions. There is a widespread tendency to support end-of-the-pipe infrastructure such as sewage and waste disposal. With the exception of functions related to (drinking) water, resources protection and nature conservation activities are rarely supported. However, resource provision and the existence of larger protected areas characterise rural rather than urban areas. Furthermore, most ecological functions implemented in the present state equalisation laws are only represented by conditional grants or the provision of loans for local government. Apart from area as an indirect indicator for certain ecological functions, there is no principal or additional approach based on an indicator generally taking into account ecological functions comparable to the consideration of inhabitants for the socio-economic functions. Consequently, lump-sum transfers as the major source of income for local governments in most of the states are still based on purely socio-economic indicators. Ecological functions predominantly provided by rural and remote areas are underrepresented in the state equalisation laws, and therefore the respective local governments are not compensated for the external benefits of their expenditure. This insuffi-



cient spatial coincidence of costs and benefits leads to an under-provision of the public goods and services concerned (Bergmann 1999).

## **4.2 Options to systematically integrate ecological functions**

One way of counteracting the under-provision of ecological public goods and services would be to systematically integrate ecological functions into the various state equalisation laws. There are basically four ways of realising this integration.

Firstly, the total amount of finance available for distribution to local government could be divided such that ecological functions are also taken into account. Before any indicators come into play, a certain amount of funds could be earmarked in advance for ecological purposes in addition to the monies set aside for the traditional purposes (Ewers et al. 1997; Rose 1999). This approach can be regarded as an extension of the advance-splitting of finances for local councils, district councils and district independent city councils that is part of most state equalisation laws.

Secondly, the principal approaches to determining the financial requirements of and hence the lump-sum transfers to local governments may be modified. In addition to existing inhabitant-based approaches, the calculation of local financial requirements may also be based on ecological indicators provided that direct costs related to ecological public functions really exist for the local jurisdiction. Bizer et al. (1998, p. 54) and Bergmann (1999) argue against the consideration of ecological functions by way of modifying the principal approach. They suppose that no considerable direct costs accrue for local ecological public goods and services that may generally justify this major step, and also argue there is no legal basis for considering the category of opportunity costs. Although the existence of these indirect costs is generally acknowledged for certain priority areas due to various restrictions on economic development, they cannot be exactly calculated.

Therefore, only the category of direct costs represents a basis for considering ecological functions in the principal approach. In contrast to the above-mentioned position based on a vague supposition, it is instead suggested that the costs borne by local governments related to the provision of ecological goods and services be thoroughly analysed. Empirical studies should be carried out for existing direct costs arising from the fulfilment of present responsibilities. In addition to this static approach reflecting the state of the art, such an analysis should also include an estimation of potential costs considering necessary future tasks based on the latest ecological research. Founded on these empirical and prospective studies, appro-

appropriate abiotic or biotic indicators need to be identified that might constitute a link between the ecological functions and the respective costs. In analogy to the socio-economic functions and the general indicator of inhabitants, ecological functions should also be reflected by a rather basic indicator which is not too unwieldy. Bauer et al. (1996, p. 191) and Rose (1999) have already suggested various abiotic, biotic and area-related indicators. Another task still to be performed consists in justifying the relationship between ecological indicators and the cost-effectiveness of ecological functions at the local governmental level.

Thirdly, instead of the principal approach, complementing additional approaches to calculate the local financial requirements might be adapted to take into account ecological functions. Whereas the principal approach has to take into account the general and average financial requirements of the jurisdiction, the additional approaches should consider community-individual, regional and transregional extra financial burdens. Therefore, Bergmann (1999) suggests extending these additional approaches which are explicitly meant to unfold a certain steering function that can be used to integrate the ecological functions of the local governments.

Fourthly, conditional grants are well-suited for specified and concrete public investments related to ecological functions of the local jurisdiction. This option has been more or less realised in several state equalisation laws. A more systematic integration of ecological public functions, especially concerning resource protection as opposed to end-of-the-pipe activities, has yet to be implemented.

## **5 Towards linking regional sustainability and environmental federalism**

Sustainable development represents a goal for overall policy formulation, be it environmental, economic or social policy. Therefore, it calls for an integrative policy perspective that addresses the interrelationship between different policies and the respective institutions. This holds for any governmental level, including the local and regional ones. However, fiscal federalism in Germany, as realised in the current fiscal equalisation laws, predominantly assigns economic and social functions to different governmental levels. Socio-economic indicators serve as the main basis for the intergovernmental grant system and thus determine the allocation of financial resources to the local and district councils, enabling them to fulfil their governmental functions. The comprehensive implementation of sustainable development also requires the consideration of ecological functions in the system of intergovernmental fiscal relations. In the federal system of Germany, the fiscal equalisation laws of the states should be

complemented by appropriate ecological indicators. Environmental federalism would then be achieved regarding both the ecological functions and the financial resources needed to secure the provision of ecological services. In this way, a basic prerequisite for sustainable development – taking into consideration ecological, economic and social aspects – would be fulfilled for fiscal instruments that are of pre-eminent importance for the local and regional level of government, thereby helping to translate regional sustainability into reality.

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